

What is claimed is:

1 1. A method for use in packet communication, comprising the steps of:
2 encapsulating contents of a first Ethernet packet received at a port of a switch of a
3 metropolitan area Ethernet network in at least one encapsulating Ethernet packet that is to
4 traverse said metropolitan area Ethernet network; and
5 assigning the source address of said at least one encapsulating Ethernet packet to
6 be the address of said port at which said packet was received.

1 2. The invention as defined in claim 1 wherein said contents of said first Ethernet
2 packet is the entirety of said first Ethernet packet.

1 3. The invention as defined in claim 1 wherein said contents of said first Ethernet
2 packet is a portion of said first Ethernet packet.

1 4. The invention as defined in claim 1 wherein said encapsulating and assigning
2 steps are performed in an Ethernet switch of said metropolitan area Ethernet network at
3 an interface between said metropolitan area Ethernet network and another Ethernet
4 network.

1 5. The invention as defined in claim 1 wherein said encapsulating and assigning
2 steps are performed in an Ethernet switch of said metropolitan area Ethernet network at
3 an interface between said metropolitan area Ethernet network, which serves a plurality of
4 entities, and another Ethernet network, which serves only a single one of said entities.

1 6. The invention as defined in claim 1 further including the step of incorporating
2 in said at least one encapsulating Ethernet packet an entity identifier which is a function
3 of said address of said port at which said packet was received.

1 7. The invention as defined in claim 6 wherein said entity identifier is a virtual
2 local area network (VLAN) tag.

1 8. The invention as defined in claim 1 wherein said encapsulating step is
2 performed so that a first portion of said first Ethernet packet is encapsulated in said at
3 least one encapsulating Ethernet packet and a second portion of said first Ethernet packet
4 is encapsulated in at least a second encapsulating Ethernet packet that is to traverse said
5 metropolitan area Ethernet network, the method further including the step of:
6 assigning the source address of said second encapsulating Ethernet packet to be
7 the address of said port at which said packet was received.

1 9. The invention as defined in claim 1 further including the step of:
2 assigning said at least one encapsulating packet a destination address as a function
3 of a stored association between the destination address of said first Ethernet packet and a
4 destination address for said metropolitan area Ethernet network of a previously received
5 Ethernet packet from said metropolitan area Ethernet network.

1 10. The invention as defined in claim 1 further including the step of:
2 assigning said at least one encapsulating packet a destination address as a function
3 of a stored association between the destination address of said first Ethernet packet and a
4 port of said metropolitan area Ethernet network.

1 11. The invention as defined in claim 1 further including the step of:
2 assigning said at least one encapsulating packet as at least one type from a set of
3 types consisting of a broadcast packet and a multicast packet.

1 12. The invention as defined in claim 11 wherein said step of assigning said at
2 least one encapsulating packet as a broadcast packet is performed when said first packet
3 is a broadcast or a multicast packet.

1 13. The invention as defined in claim 11 wherein said step of assigning said at
2 least one encapsulating packet as a broadcast packet is performed when there is no stored
3 association between the destination address of said first Ethernet packet and a destination
4 address for said metropolitan area Ethernet network of a previously received packet from
5 said metropolitan area Ethernet network.

1 14. The invention as defined in claim 1 wherein said metropolitan area Ethernet
2 network supports virtual local area network (VLAN) tags, and wherein said first Ethernet
3 packet is a broadcast or multicast packet, the method further comprising the step of:

4 incorporating an entity identifier which is a function of said address of said port at
5 which said first Ethernet packet was received as a VLAN tag in said encapsulating
6 packet; and

7 assigning said at least one encapsulating packet as a broadcast packet.

1 15. An edge switch for use in a metropolitan area Ethernet network having ports
2 adapted to be coupled to at least one local area Ethernet network, said edge switch
3 comprising:

4 at least one port for receiving inner Ethernet packets from at least one of said local
5 area Ethernet networks and for transmitting inner Ethernet packets to said at least one of
6 said local area Ethernet networks, said at least one port being one of said ports of said
7 metropolitan area Ethernet network; and

8 a memory for establishing a correspondence association between addresses within
9 said at least one local area Ethernet network and addresses of said ports in said
10 metropolitan area Ethernet network.

1 16. The invention as defined in claim 15 wherein given an address of a particular
2 one of said addresses within said at least one local area Ethernet network said switch is
3 operable to retrieve said corresponding associated one of said addresses of said ports in
4 said metropolitan area Ethernet network.

1 17. The invention as defined in claim 15 wherein said memory further associates
2 a time stamp with each said associated address within said at least one local area Ethernet
3 network and address of said ports in said metropolitan area Ethernet network.

1 18. The invention as defined in claim 15 further comprising a virtual local area
2 network (VLAN) tag marker.

1 19. The invention as defined in claim 15 further comprising a memory
2 associating said at least one port of said metropolitan area Ethernet with an entity.

1 20. The invention as defined in claim 15 further comprising a packet stripper that
2 extracts said inner Ethernet packets from encapsulating packets for transmission to said
3 local area Ethernet via said port.

1 21. The invention as defined in claim 15 further comprising:
2 a packet stripper that extracts at least a respective portion of a one of said inner
3 packets from at least two different encapsulating packets; and
4 an inner packet reassembler that receives said portions of said inner packet from
5 said packet stripper and reconstructs therefrom said one of said inner packets.

1 22. The invention as defined in claim 15 further comprising:
2 a memory writer for forming an association in said memory between a received
3 encapsulating packet's source address and a source address of an inner packet within said
4 encapsulating packet.

1 23. The invention as defined in claim 15 further comprising:
2 an encapsulator that embeds each of said received inner packets as a payload in at
3 least one encapsulating packet and places the address of said at least one port within the
4 source address field of said at least one encapsulating packet.

1 24. The invention as defined in claim 23 wherein said encapsulator further places
2 within the destination address field of said at least one encapsulating packet an address of
3 said metropolitan area Ethernet network that is associated within said memory with a
4 destination address of said inner packet.

1 25. The invention as defined in claim 23 wherein said encapsulator further places
2 within the destination address field of said at least one encapsulating packet an indication
3 that said encapsulating packet is a multicast packet when there is no address of said
4 metropolitan area Ethernet network associated within said memory with a destination
5 address of said inner packet.

1 26. The invention as defined in claim 23 wherein said encapsulator further places
2 within the destination address field of said at least one encapsulating packet an indication
3 that said encapsulating packet is a broadcast packet when there is no address of said
4 metropolitan area Ethernet network associated within said memory with a destination
5 address of said inner packet.

1 27. The invention as defined in claim 23 further comprising:
2 a virtual local area network (VLAN) tag marker; and
3 wherein said encapsulator further places within the destination address field of
4 said at least one encapsulating packet an indication that said encapsulating packet is a
5 broadcast packet when there is no address of said metropolitan area Ethernet network
6 associated within said memory with a destination address of said inner packet, and said
7 VLAN tag marker marks said encapsulating packet with a VLAN tag corresponding to an
8 entity associated with said port at which said inner packet was received.

1 28. Program code in computer readable form for use in processing Ethernet
2 packets, said computer readable program code comprising:
3 a module for encapsulating contents of a first packet received at a port of a
4 metropolitan area Ethernet network in at least one encapsulating Ethernet packet that is to
5 traverse said metropolitan area Ethernet network; and
6 a module for assigning the source address of said at least one encapsulating
7 Ethernet packet to be the address of said port at which said packet was received.

1 29. Apparatus for use in providing metropolitan area Ethernet service,
2 comprising:

3 means for encapsulating contents of a first packet received at a port of a
4 metropolitan area Ethernet network in at least one encapsulating Ethernet packet that is to
5 traverse said metropolitan area Ethernet network; and

6 means for assigning the source address of said at least one encapsulating Ethernet
7 packet to be the address of said port at which said packet was received.

1 30. A metropolitan area Ethernet network, said metropolitan area Ethernet
2 network comprising:

3 a plurality of edge switches, each of said edge switches being coupled to at least
4 one of a plurality of local area networks (LANs) at ports of said edge switches, wherein,
5 said edge switches encapsulate contents of inner packets received from said LANs into at
6 least one encapsulating Ethernet packet, said encapsulating Ethernet packet employing as
7 a source address an address of a one of said ports of said edge switch at which its
8 encapsulated inner packet was received; and

9 at least one core switch for switching said encapsulating packets;

10 wherein each of said plurality of edge switches is coupled to said at least one of
11 said core switches.

1 31. A method for use in packet communication, comprising the steps of:

2 dividing a first Ethernet packet having a source address and a destination address
3 that is received at a port of a metropolitan area Ethernet network into first and second
4 parts, said first and second parts being taken from portions of said first Ethernet packet
5 exclusive of said source address and said destination address;

6 encapsulating said first and second parts in at least two respective encapsulating
7 Ethernet packets that are to traverse said metropolitan area Ethernet network;

8 assigning the source address of each of said encapsulating Ethernet packets to be
9 the address of said port at which said first packet was received;

10 assigning the source address of said first Ethernet packet as an inner source
11 address of each of said encapsulating packets; and

12 assigning the destination address of said first Ethernet packet as an inner
13 destination address of each of said encapsulating packets.

1 32. The invention as defined in claim 31 wherein first and second parts taken
2 from portions of said first packet are divided at a point that is a function of a random
3 number generator with a prescribed distribution.

1 33. A method for use in packet communication, comprising the steps of:
2 receiving at least first and second encapsulating packets at an edge switch of a
3 metropolitan area Ethernet network, each of said encapsulating packets containing a
4 portion of data and/or cyclic redundancy check of a first inner packet that was fragmented
5 into at least first and second encapsulating packets for transport via said metropolitan area
6 Ethernet network; and
7 reassembling said first inner packet using said portions of data and/or cyclic
8 redundancy check contained within said first and second encapsulating packets.

1 34. The invention as defined in claim 33 wherein said first inner packet contained
2 a source address and a destination address and each of said encapsulating packet further
3 contains said source address and said destination address of said first inner packet.

1 35. A method for use in packet communication comprising the steps of:
2 encapsulating a first portion of an inner Ethernet packet received at a port of a
3 metropolitan area Ethernet network into a first encapsulating Ethernet packet;
4 encapsulating a second portion of said inner Ethernet packet into a second
5 encapsulating Ethernet packet when said first encapsulating Ethernet packet would
6 exceed a prescribed Ethernet maximum packet length if said first portion was the entirety
7 of said inner Ethernet packet; and
8 assigning the source address of said first encapsulating Ethernet packet to be the
9 address of said port at which said packet was received.

1 36. The invention as defined in claim 35 further comprising the step of assigning
2 the source address of said second encapsulating Ethernet packet to be the address of said
3 port at which said packet was received when said first encapsulating Ethernet packet
4 would exceed said prescribed Ethernet maximum packet length if said first portion was
5 the entirety of said inner Ethernet packet.

1 37. The invention as defined in claim 36 further comprising the steps of:
2 assigning a first sequence number to said first encapsulating Ethernet packet; and
3 assigning a second sequence number different from said first sequence number to
4 said first encapsulating Ethernet packet.

1 38. The invention as defined in claim 36 wherein the length of said first portion
2 and the length of said portion is selected is selected so that said first and second
3 encapsulating packets conform to a prescribed distribution for lengths of encapsulating
4 packets.

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